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09/987,683	11/15/2001	Mark Henry Shipton	111129	7535

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EXAMINER

WILKINS III, HARRY D

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/987,683

Applicant(s)

SHIPTON ET AL.

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**DETAILED ACTION**

1. The rejection under 35 USC 103 based on Darolia et al is withdrawn in view of Applicant's remarks regarding the teaching away from adding Si in the alloy of Darolia et al.
2. The rejection under 35 USC 103 based on DeBussac et al and Hino et al is withdrawn in view of Applicant's remarks regarding that Hino et al does not constitute prior art under 35 USC 102.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wukusick et al (GB 2,235,697) in view of Naik et al (US 5,077,141).

Wukusick et al teach the invention substantially as claimed. Wukusick et al teach (see paragraph Table 1, page 3) a composition which compares with the presently claimed composition as follows:

(All in wt%)	Claimed	Wukusick et al	Comparison
Cr	4-8	5-10	Overlap at 5-8
Al	5-6.5	5-7 (6.2 most preferred)	Overlap at 5-6.5
Co	2-6	5-10	Overlap at 5-6
Ta	4-8	3-8	Overlap at 4-8
Re	3-5	0-6 (3 most preferred)	Prior Art is broader
Hf	0.1-0.5	0-0.5 (0.15 most preferred)	Overlap at 0.1-0.5
C	0.04-0.1	0-0.07 (0.05 most preferred)	Overlap at 0.04-0.07
Si	0.05-0.3	Not intentionally added	

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B	0.003-0.01	0-0.015 (0.004 most preferred)	Prior Art is broader
W	(<5)	3-10	
Pt	(<5)		
La	(0.003-0.008)		
Y	(0.003-0.008)	0-0.075	
Others		0-2 Mo, 0-2 Ti	

It would have been within the expected skill of a routineer in the art to have optimized the composition of Re and B in the alloy Wukusick et al in order to achieve sufficient strength from Re and low angle grain boundary strengthening from B (for support see Naik et al at paragraph spanning cols 5 and 6 and Wukusick et al at pages 19-20).

Wukusick et al are silent on the content of Si.

However, Naik et al teach (see abstract and col 5, lines 46-56) that 0.02-1.0 wt% of Si is added to a Ni-base alloy for improving the oxidation and corrosion resistance of the alloy, without the formation of excessive quantities of low melting compounds.

Therefore, it would have been obvious to one of ordinary skill in the art to have added 0.02-1.0 wt% of Si as taught by Naik et al to the alloy of Wukusick et al for the known purpose of improving oxidation and corrosion resistance.

Regarding claims 2, 3, 15, 16, 17 and 18, the alloy of Wukusick et al may contain further elements, such as Mo and Ti; however, as each of the ranges for these elements includes zero, they may be omitted (i.e.-are substantially excluded).

Regarding claim 4, the alloy of Wukusick et al further contains 3-8 wt% W and 0-0.075 wt% Y. It would have been within the expected skill of a routineer in the art to have optimized the content of Y in order to maximize the added oxidation resistance (for support see Naik et al at col 6, lines 30-36).

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Regarding claim 5, Wukusick et al in view of Naik et al teach an alloy which consists essentially of Cr, Al, Co, Ta, Re, Hf, C, Si, B, W and Y, with the balance Ni.

Regarding claim 6, the values for Al, Ta, Re, C, Si, B and Y fall within the disclosed range of Wukusick et al in view of Naik et al. It would have been within the expected skill of a routineer in the art to have optimized the composition in order to maximize the chemical and mechanical properties of the alloy. The values of Cr and Co are just outside the ranges disclosed by Wukusick et al, and are close enough (4.5 wt% vs. 5.0 wt% Cr and 4 wt% vs. 5 wt% Co) that one of ordinary skill in the art would have expected that the two values would yield the same properties. See MPEP 2144.05. The value of W is outside of the range disclosed by Wukusick et al. No function is attributed to W by Wukusick et al. It was well known in the art that W could provide sufficient strength in Ni-based alloys even when added at as little as 2 wt% (for support, see Sato et al at col 9, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art to have reduced the amount of W in the alloy of Wukusick et al because sufficient strength can still be maintained at only 2 wt%. Darolia et al fail to teach adding 0.003-0.005 wt% La to the alloy. Naik et al teach col 6, lines 30-36) that La, provides improved oxidation resistance in combination with Y. Therefore, it would have been obvious to one of ordinary skill in the art to have added La as taught by Naik et al to the alloy of Wukusick et al and to have optimized the amount added to maximize the oxidation resistance.

5. Claims 7, 11-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wukusick et al (GB 2,235,697) in view of Naik et al (US 5,077,141)

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as applied to claims 1-6 above, and further in view of Schell et al (US 5,622,638) and Applicant's admission of prior art.

The teachings of Wukusick et al in view of Naik et al are described above in paragraph no. 5.

Wukusick et al in view of Naik et al do not teach a method for forming a blade tip of a gas turbine comprising applying the nickel composition to the tip of a gas turbine blade.

Schell et al teach (see abstract) teach a method of applying a nickel alloy composition to the tip of a gas turbine blade.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the alloy of Wukusick et al in view of Naik et al for the conventional use of a blade tip on a turbine blade as taught by Schell et al because the alloy of Wukusick et al has excellent resistance to oxidation and corrosion (see abstract).

Regarding claim 11, Applicant admits as prior art (see page 1) that laser deposition (cladding) is a known method applicable to the method of Schell et al.

Regarding claim 12, Schell et al teach (see claims 1, 7, 8 and 9) a method that includes laser depositing a Ni alloy to the tip of a gas turbine blade to a near-net shape followed by machining to achieve the final shape.

Regarding claim 13, Schell et al teach (see claim 9) that the deposition is applied by a laser fusing process.

Regarding claims 14 and 20, Applicant admits as prior art (see page 1) that a conventional blade tip addition is a squealer.

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6. Claims 8-10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wukusick et al (GB 2,235,697) in view of Naik et al (US 5,077,141) as applied to claims 1-6 above, and further in view of Mukira et al (US 6,468,367).

The teachings of Wukusick et al in view of Naik et al are described above in paragraph no. 5.

Wukusick et al in view of Naik et al do not teach a method of repairing a gas turbine blade comprising applying the nickel composition to a damaged portion of the gas turbine blade.

Mukira et al teach (see col 1, lines 20-35) that it is common in the art to apply a repair alloy (Ni based weld wire) to a damaged turbine blade by a tungsten arc welding process to repair the blade.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the alloy of Wukusick et al in view of Naik et al for the conventional repairing method as taught by Mukira et al because the alloy of Wukusick et al has excellent resistance to oxidation and corrosion (see abstract).

Regarding claims 9 and 10, Mukira et al teach (see col 1, lines 20-35) that the article is a Ni alloy turbine blade.

Regarding claim 19, Schell et al teach (see claim 9) that the deposition is applied by a laser fusing process.

### ***Response to Arguments***

7. Applicant's arguments filed 3 July 2003 have been fully considered but they are not persuasive. Applicant has argued that:

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a. It would not have been within the expected skill of a routineer in the art to have optimized the content of B in the alloy of Wukusick et al because the B is optimized to provide grain boundary strengthening but the alloy of Wukusick et al is a single crystal alloy; and,

b. Naik et al fails to teach a suggestion for adding Si to the alloy of Wukusick et al.

In response to Applicant's first argument, attention is brought to pages 19-20 of Wukusick et al, where the addition of B (and C and Zr) is discussed. Particularly, Wukusick et al point out that heretofore, additions of B had been avoided. However, Wukusick et al discovered that limited amounts of B can be added to affect the low angle grain boundaries present in single crystal alloys, thus providing the grain boundary strengthening. Therefore, it would have been within the expected skill of a routineer in the art to have optimized the amount of B present in the alloy of Wukusick et al in order to optimize the grain boundary strengthening effects.

In response to Applicant's second argument, Naik et al explicitly teaches (see col. 5, lines 46-56) that Si and Hf, either singly or in combination, are added for increasing oxidation and corrosion resistance. Therefore, Naik et al explicitly discloses adding Si alone to a single crystal nickel base alloy for improving oxidation and corrosion resistance. Therefore, it would have been obvious to one of ordinary skill in the art to have added Si, as taught by Naik et al, to the alloy of Wukusick et al, for the known purpose of increasing oxidation and corrosion resistance.



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***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw  
August 13, 2003

ROY KING   
SUPERVISORY PATENT EXAMINER  
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